Chapter 24 – Chemical Hazard Communication Plan (REDACTED)

24.1 Purpose

This chapter establishes a Hazard Communication Program in compliance with Federal Occupational Safety and Health Administration (OSHA) and NASA standards, in order to reduce the incidence of chemical-related occupational illnesses and injuries.

24.2 Applicability

This chapter is applicable to all Ames Research Center (ARC) employees, to all work conducted under the authority of Ames, and to all equipment and property managed by Ames. For Ames contractors, it is applicable through contract clauses in conformance with NASA Procurement Regulation (REDACTED). Non-Ames and noncontractor personnel will follow the provisions of this handbook while at Ames facilities. Hazard communication requirements are applicable to acquisition and disposal of property that contains (or contained) hazardous materials.

24.3 Scope

This chapter provides for protection of employees from adverse health effects from exposure to hazardous materials by informing them about the materials present in the workplace. Protection of the environment is addressed in the Ames Environmental Management Handbook (AHB 8800.3).

24.4 Definitions

1. **Ceiling Limit:** The maximum concentration of an airborne contaminant to which an employee may be exposed at any time.
2. **Designated Area:** Space with access limited by locks or barriers, clearly marked with a warning sign that specifies hazards within (example: "WARNING: CANCER-SUSPECT AGENT. AUTHORIZED PERSONNEL ONLY").
3. **Hazardous Chemical:** Any material that, because of its quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released into the workplace or the environment.
4. **Excluded Materials:** Items to which this program does not apply (but which may be subject to separate requirements), including:
    - Any hazardous waste as defined by the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act (RCRA) (1976).
    - Tobacco or wood products, when not treated with hazardous chemicals and not to be processed.
    - Foods, drugs, or cosmetics for personal consumption or use by employees while in the workplace.
    - Nuisance particulates that do not pose a health hazard.
    - Ionizing and nonionizing radiation.
    - Biological hazards.

- Any other substances excluded from regulation by 29 CFR 1910.1200, that do not expose employees to hazards under normal conditions of use. This category includes "articles," that are defined as manufactured items:
- That are formed to a specific shape or design during manufacture;
- That have end-use function(s) dependent in whole or in part upon their shape or design during end use; and,
- That do not release or otherwise result in exposure to a hazardous chemical, under normal conditions of use.

5. **Hazard Warning:** Words, pictures, symbols, or a combination thereof that appears on a label or other appropriate form of warning that conveys the specific physical and health hazards, including target organ effects, of the material in the container.
6. **Hazardous Chemical Container:** Any bag, barrel, bottle, box, can, cylinder, drum, reaction vessel, storage tank, chemical transfer pipe, etc., that contains a hazardous chemical.
7. **Laboratory:** A facility in which research or analytical chemical procedures are performed, where hazardous materials are stored and used in quantities that may easily be handled by one person (container sizes do not exceed five gallons).
8. **Material Safety Data Sheet (MSDS):** Document prepared by the chemical manufacturer to provide safety, health, and environmental information for a substance or chemical material.
9. **National Fire Protection Association (NFPA) label:** A label bearing the hazard rating system promulgated by the National Fire Protection Association.
10. **Permissible Exposure Limit (PEL):** Limit established by OSHA as the maximum permitted eight-hour time-weighted average concentration of an airborne contaminant. Exposure limits for many hazardous materials are listed in 29 CFR 1910.1000.
11. **Threshold Limit Value (TLV):** Limit established by the American Conference of Governmental Industrial Hygienists (ACGIH) as the maximum permitted eight-hour time-weighted average concentration of an airborne contaminant. Federal facilities observe both PELs and TLVs as workplace exposure limits.

    Note: Contact the Safety Office or refer to ANSI Standard Z400.1 93, Glossary (Appendix D) for more definitions.

24.5 Responsibilities

24.5.1 Safety Office

The Safety Office administers programs that provide for overall hazardous materials compliance for health and safety requirements. The Safety Office responsibilities for Chemical Hazard Communication include:

1. Provide oversight of the Chemical Hazard Communication Program and guidance to Chemical Hygiene Representatives, line managers, and personnel who utilize hazardous materials.
2. Provide Hazard Communication training to civil service employees as requested by managers.
3. Review proposed operations and/or operating procedures for use of hazardous materials as requested by supervisors.
4. Provide oversight of chemical procurements, including open orders and bank cards, which may be used to acquire hazardous materials.

5. Periodically review the Chemical Hazard Communication Program for compliance with OSHA and NASA standards.

24.5.2 Managers and Supervisors

REDACTED

24.5.3 Contracting Officer's Technical Representative (COTR)

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24.5.4 Contractors (Managers and Supervisors)

The senior onsite manager, foreman, or supervisor of contractors whose employees use, handle, or store hazardous materials must ensure that hazard information concerning materials acquired and brought on site by the contractor is made available to all affected groups. The following actions are necessary to fulfill this requirement:

1. Ensure that MSDSs (as hard copies or electronic files) are available for all hazardous chemicals in the work area, stored or in use, during all shifts.
2. Ensure that hazardous chemical containers are properly labeled.
3. Ensure that employees receive timely and appropriate general and task-specific hazard communication training.
4. Ensure advance communication to the Safety Office and all affected groups when a material that may present a hazard to persons other than the user will be introduced into the workplace, in order to comply with OSHA requirements for multi-employer worksites.
5. Ensure that acquisitions of hazardous materials are subject to all applicable Safety Office requirements.
6. In the event of an incident involving exposure to or release of a hazardous material, cooperate with emergency response personnel by providing a copy of the MSDS and other relevant information.

24.5.5 Employees

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24.5.6 Acquisition Division

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24.5.7 Shipping and Receiving Personnel

1. Ensure that received containers of hazardous materials are properly labeled.
2. Ensure that MSDSs accompany all incoming hazardous chemicals as required on the purchase request.
3. Ensure that laboratory-generated materials shipped from ARC are accompanied by appropriate MSDSs.

24.5.8 Ames Health Unit

1. Participate in investigation of health issues that may involve chemical exposure, including referring chemical exposure monitoring needs to the Safety Office and accessing MSDSs as needed for information regarding chemical composition and advice to physicians.
2. Contact the manufacturer or importer, using the emergency information phone number provided on the MSDS, in an emergency situation when health care providers need access to trade secret information to determine appropriate medical treatment.

24.6 Hazard Communication Plan

This Hazard Communication Plan describes how ARC provides MSDSs, labels and other warnings, employee information and training, and lists of hazardous chemicals present in the workplace to government and contractor employees. This information is provided in English and in other languages as needed.

24.6.1 Material Safety Data Sheet (MSDS)

The manufacturer's current MSDS is obtained by the user before acquisition of any hazardous material and is maintained in a location accessible to worksites where the material is stored or used. MSDSs may be obtained by contacting the vendor directly, or through online services such as the MSDS web site maintained by Cornell University at http://msds.pdc.cornell.edu/issearch/msdssrch.htm. If an online service is used, the MSDS obtained must exactly match the product name and manufacturer of the item to be purchased.

24.6.1.1 Format

The MSDS contains physical data and other information specified by OSHA. MSDSs should follow the 16-part format recommended in the American National Standards Institute (ANSI) standard Z400.1. OSHA-specified elements are listed below under the headings where they appear in this format.

1. Chemical Product and Company Identification
   - Chemical and common names.
   - Identifiers such as the Chemical Abstracts Service/Registry of Toxic Effects of Chemical Substances (CAS/RTECS) numbers, etc., as used on the label.
   - Manufacturer/distributor information.
   - Date of preparation or alteration of the MSDS.
2. Composition, Information on Ingredients.
   - Chemical components that comprise 1.0 percent or greater of the material.
   - Chemical components that comprise 0.1 percent or greater of the material if the component is determined to be a carcinogen.
   - Chemical components that comprise less than 1 percent (less than 0.1 percent for carcinogens) of the mixture if there is evidence that the ingredients could be released from the mixture in concentrations that would exceed an established OSHA PEL or ACGIH TLV or could present a health hazard to employees.
   - Exposure limits (PEL, TLV, other).
3. Hazards Identification
   - Physical hazards.
   - Acute and chronic health effects.
   - Exposure symptoms.
   - Routes of entry into the body.
   - Listed carcinogen.
4. First Aid Measures
   - First aid procedures.
   - Medical conditions that may be aggravated by exposure to the substance.

5. Fire fighting Measures
6. Accidental Release Measures
7. Handling and Storage
    - Precautions for safe handling.
8. Exposure Controls, Personal Protection
9. Recommended engineering and administrative controls.
10. Precautions for safe handling and use.
11. Physical and Chemical Properties
    - Physical and chemical characteristics.
12. Stability and Reactivity
13. Toxicological Information
14. Ecological Information
15. Disposal Considerations
16. Transport Information
17. Regulatory Information
18. Other Information

24.6.1.2 Acceptability

The MSDS for each hazardous material is reviewed by the Safety Office upon receipt from the requesting organization. An acceptable MSDS is dated, contains all required elements with no blank spaces, and provides an adequate level of information for ingredients, hazards, and protective measures. Replacements for unacceptable MSDSs are obtained by the requesting organization; no chemical may be handled unless the information provided in the MSDS is adequate to ensure personnel safety. Chemicals for which an acceptable MSDS is not available are returned to the supplier or safely stored, pending consultation with the Safety Office.

24.6.1.3 Updates

Updated MSDSs containing new information on a hazardous chemical are disseminated to employees as soon as possible, but no later than three months after receipt.

24.6.1.4 CASH MSDSs

The Computer Aided Safety and Health Information (CASH) database provides electronic access to MSDSs for many chemicals at ARC. The Safety Office provides CASH access, training, and information on request. The data contained in CASH MSDSs are extracted from manufacturer MSDSs. For verification of the data, users should refer to the actual manufacturer MSDSs. Where manufacturer's text exceeds CASH field size, a note refers the user to the manufacturer's original MSDS. Paper copies of manufacturers' MSDSs are maintained in the Safety Office, filed by the Safety Office File Number, which is found on Screen 16b of the CASH MSDS.

24.6.2 Chemical Inventory

An inventory for each chemical storage site is prepared annually (minimum) by government or contractor personnel responsible for storage and use areas. Inventory elements and process are described in the Ames Environmental Management Handbook, AHB 8800.3.

24.6.3 Labeling

Each workplace container of hazardous material is labeled, tagged, or marked to identify the material and to provide appropriate warnings. Alternative methods such as signs, placards, process sheets, and operating procedures are acceptable for individual stationary process containers, as long as the information is conveyed to all affected persons. In the Ames multi-employer workplace, there are few exceptions to the requirement for explicit, attached labels. Section 24.8.3 contains a list of items that are exempted from the Hazard Communication labels, but may be subject to other labeling requirements. Laboratories may follow labeling provisions defined in AHB 1700.1, Chapter 13, Chemical Hygiene Program, in accordance with 29 CFR 1910.1450, the OSHA Laboratory Standard.

24.6.3.1 General Requirements

The following rules and guidelines apply to all chemical containers.

1. At a minimum, the label should identify the chemical, and contain hazard warnings (including target organ effects). The chemical identity provided on the label must be the same as or cross-referenced to the same identifier on the MSDS and inventory. The user shall label all containers to which chemicals may be transferred from the primary container, prior to transfer.
2. Hazardous Materials regulated by OSHA substance-specific health standards in 29 CFR 1910 shall bear labels in accordance with the applicable standard. These substances are listed in section 24.9.2.
3. Containers that are or become hazardous waste shall also bear Hazardous Waste labels in accordance with the Ames Environmental Management Manual.
4. Incoming containers received with defaced or missing labels should be rejected unless the contents are definitely known and the container is immediately labeled with the appropriate information.
5. Labels shall not be removed or defaced, and must remain intact.
6. Labels must be legible, in English (another language may be used in addition to English when appropriate), and prominently displayed on the exterior of the container.
7. Preprinted and manufacturers' labels must be revised within three months of receipt of significant new information and before the material is reintroduced into the worksite.
8. The Safety Office strongly recommends that labels also contain the following supplemental information:
    - Name of owner or responsible person.
    - Date dispensed or mixed.
    - Expiration date.

24.6.3.2 Chemical Labels

Preprinted chemical labels for commonly used hazardous materials are available through the Safety Office support service contractor. Biohazard and Target Organ labels are also available. A current list and set of instructions is available from the Safety Office. Blank NFPA system labels are also available from Ames Stores Stock.

24.6.4 Information Management

24.6.4.1 Documents

Copies of this Hazard Communication Plan and relevant standards are maintained in the Safety Office (N218) and are accessible to employees, contractors, health care providers, and

emergency responders. The Safety Office is available to provide additional information, reference materials, and consultation. MSDSs are available via weblinks from the Code Q website. The Building Emergency Action Plan (BEAP), which contains chemical inventories for each building, is compiled and updated annually. The BEAP is provided to NASA management (Division, Branch, or Office Chief) resident in the building, as well as to local emergency responders and agencies as needed.

24.6.4.2 Trade Secrets

In an emergency, where a treating physician or nurse determines that the specific chemical identity of a hazardous chemical is necessary for emergency or first aid treatment, the manufacturer shall be contacted immediately at the emergency information number provided on the MSDS. The manufacturer or importer is required by law to disclose the specific chemical identity of a trade secret chemical, regardless of the existence of a written statement of need of a confidentiality agreement. In a nonemergency situation, the employee, physician, or other person with a need to know a manufacturer's trade secret information may request that information in writing. However, the employee should consult first with the Office of the Patent Counsel (DL). Information acquired for an employee's medical record must be labeled "Trade Secret."

24.6.4.3 Communication in Multi-employer Workplace

Identification of major facility hazardous operations, and chemical inventories, are available to contractor employees through the COTR. Hazardous chemicals to be acquired or used by onsite contractors are identified to contracting officers, government managers, and/or COTRS in proposals and/or safety submittals. MSDSs for proposed hazardous materials are provided to the Safety Office with the Safety Plan, if possible, and in all cases prior to onsite use of hazardous materials. An explanation of any labeling system must be provided along with the chemical inventory list. Storage and use areas should be labeled to identify the hazard, with standard NFPA labels. When necessary in order to prevent exposure to others, operations with hazardous chemicals shall be performed in a designated, labeled controlled access area.

24.6.5 Acquisition

Acquisition of hazardous chemical substances, materials, and products is subject to Safety Office review and approval. The requestor identifies applicable Safety Office approvals on the funding purchase request. Equivalent reviews and approvals apply to purchase by written and electronic purchase request and by bank card. Hazardous materials may not be purchased by bank card without explicit, written authorization by the Safety Office. Authorized hazardous materials purchasers must complete annual training in current safety and environmental regulations and sign a compliance agreement.

24.6.6 Training

OSHA requires Hazard Communication training for employees who use or are potentially exposed to hazardous chemicals on a routine basis or in a foreseeable emergency. At Ames, the diversity and distribution of operations with hazardous materials necessitates all employees to attend general Hazard Communication Training. Employees who handle hazardous materials also receive task-specific training by their supervisor. A copy of this document is provided for each employee at the time of training. Required elements for these levels of training are given in the following sections.

24.6.6.1 General Hazard Communication Training

1. Scope and Purpose of the Hazard Communication Standard ("Employee Right-to-Know" law)
2. Requirements of the Hazard Communication Standard

3. Hazard Recognition
4. Control of Chemical Hazards
5. Emergency Procedures
6. Understanding the MSDS
7. Labeling System

24.6.6.2 Task-Specific Chemical Training (by supervisor)

1. Chemicals in the workplace (by chemical group or specific)
2. Labeling system (including identifiers, acronyms, and how to obtain labels)
3. Nature of hazards
4. Hazard control measures [engineering, work practices, and personal protective equipment (PPE)]
5. Monitoring (medical, air, surface)
6. Detection methods
7. Emergency procedures
8. Task training

Note: Task-specific Hazard Communication information is ideally incorporated into written operating procedures for routine and nonroutine tasks.

Note: Additional training requirements for hazardous waste and spill response is discussed in the Ames Environmental Management Plan.

24.6.6.3 Update Training

Update training is provided whenever:

1. New chemical hazard is introduced to the workplace.
2. New or updated information is received relative to materials used in the workplace (example: new MSDS).
3. Chemical use or work practices are changed.

24.6.6.4 Training Documentation

The Safety Office maintains records of training provided by the Safety Office. Supervisors may obtain attendance rosters and verifications from the Safety Office. Managers maintain records of supervisor-provided operation-specific training. Records of site and task-specific training shall include the date and time (duration), name of trainer, and outline or summary of topics presented.

24.7 Review and Update

This chapter is periodically updated.

24.8 Authority

1. NHS/IH-1845.3A, NASA Health Standard on Hazard Communication
2. 29 CFR 1910.1200, OSHA Hazard Communication Standard
3. 29 CFR 1960, Basic Program Elements for Federal Occupational Safety and Health Programs
4. NMI 8710.2, NASA Safety and Health Program
5. ANSI Z400.1-1993, Material Safety Data Sheets - Preparation

6. 58 FR 41981, Executive Order 12856, August 3, 1993, Occupational Safety and Health Programs for Federal Employees

24.9 Appendices

24.9.1 Appendix A: Performance Checklist for Hazard Communication Program

From (Contractor):			
Contract No:			
To (COTR):			
Org Code:			
Date:		Reporting Period:	to
Location:			
Bldg:			
		Laboratory(29 CFR 1910.1450 applies):	
		Other(29 CFR 1910.1200 applies):	
Brief Description of Operation:			
Yes	**No**	**1.**	**Chemical Hazard Communication Plan**
		a.	Chemical Hazard Communication Plan is current and is in compliance with ARC Chemical Hazard Communication Program, at a minimum. Hazard Communication Plan issue/review date: _____ (Requirement: annual review/update)
Yes	**No**	**2.**	**Material Safety Data Sheets**
		a.	Material Safety Data Sheets are available at the worksite for all hazardous materials.
		b.	Material Safety Data Sheets are transmitted to the Safety Office for CASH database.
Yes	**No**	**3.**	**Chemical Inventory**
		a.	Annual Chemical Inventory prepared and transmitted to the Safety Office in a complete and timely manner.
Yes	**No**	**4.**	**Labels**
		a.	Incoming chemical containers are inspected for intact labels, and manufacturers' labels are retained on containers and not defaced.
		b.	Labels are provided for all secondary and other chemical containers.
Yes	**No**	**5.**	**Training**
		a.	Employees who use or are potentially exposed to hazardous chemicals on a routine basis have completed general Hazard Communication training and annual update training (documentation provided for review).
		b.	Task-specific training is conducted by supervisors
			1. For all new employees.
			2. When a new hazard is introduced into the workplace.
			3. When hazard is increased by a substantial change in procedure.
Yes	**No**	**6.**	**Acquisition**
			a. Safety Office review and authorization/registration of use of extremely hazardous materials and hazardous air pollutants (as defined in ARC Chemical Hazard Communication Program) precedes acquisition (documentation provided for review).
Yes	**No**	**7.**	**Action Plan for Items Not Verified**
			a. Explanation and Action Plan for each "NO" answer is attached.
Submitted by:			
Printed Name			
Signature			
Date			

24.9.2 Appendix B: Substances Regulated by a Specific OSHA Standard

1910.1000	Air contaminants (Permissible Exposure Limit List)
1910.1001	Asbestos, tremolite, anthophyllite, and actinolite (see AHB 1700.1, Chapter 30)
1910.1003	4-Nitrobiphenyl
1910.1004	alpha-Naphthylamine
1910.1006	Methyl chloromethyl ether
1910.1007	3,3'-Dichlorobenzidine (and its salts)
1910.1008	bis-Chloromethyl ether
1910.1009	beta-Naphthylamine
1910.1010	Benzidine
1910.1011	4-Aminodiphenyl
1910.1012	Ethyleneimine
1910.1013	beta-Propiolactone
1910.1014	2-Acetaminofluorene
1910.1015	4-Dimethylaminoazobenzene
1910.1016	N-Nitrosodimethylamine
1910.1017	Vinyl chloride
1910.1018	Inorganic arsenic
1910.1025	Lead
1910.1027	Cadmium
1910.1028	Benzene
1910.1029	Coke oven emissions
1910.1030	Bloodborne Pathogens (see AHB 1700.1, Chapter 32)
1910.1043	Cotton dust
1910.1044	1,2-dibromo 3-chloropropane
1910.1045	Acrylonitrile
1910.1047	Ethylene oxide
1910.1048	Formaldehyde
1910.1050	Methylenedianiline
1910.1051	1,3-Butadiene
1910.1052	Methylene Chloride
1910.1101	Asbestos (see AHB 1700.1, Chapter 30)

24.9.3 Appendix C: Exceptions to Chemical Labels Requirements

The following substances are exempt from the Hazard Communication Standard labeling requirements:

1. Chemicals defined under Toxic Substance Control Act (TSCA) and subject to its labeling requirements.

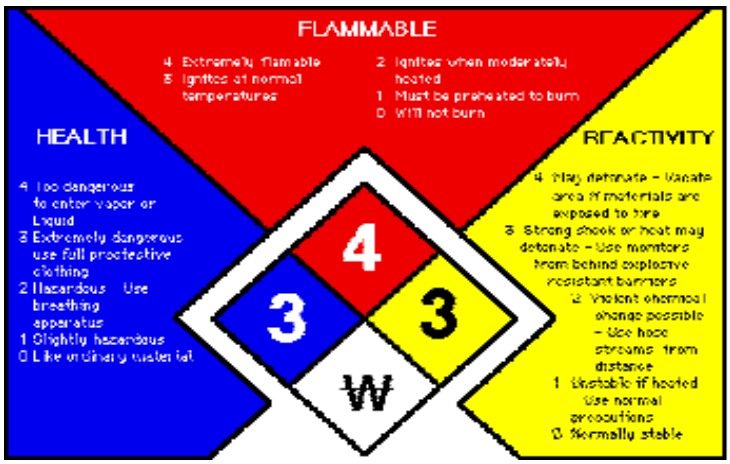
   Note: TSCA controls manufacture and distribution of new chemicals and does not apply to commercially procured chemical inventory.

2. Food, food additive, cosmetic, drug or medical/veterinary devices subject to labeling requirements defined by the Food and Drug Administration (FDA) or Department of Agriculture in the Federal Food, Drug, and Cosmetics Act or the Virus-Serum-Toxin Act.

3. Agricultural or vegetable seed treated with pesticides and labeled according to the Federal Seed Act by the Department of Agriculture.

4. Drugs dispensed by NASA clinics for direct patient administration.
5. Pesticides subject to labeling requirements established by the Environmental Protection Agency.
6. Consumer products or hazardous materials subject to a consumer product safety standard and regulated by the Consumer Product Safety Commission.

24.9.4 Appendix D: NFPA Chemical Label



Fire Hazard Fire Hazard (red): ranks the specific material's susceptibility to burn		**Health Hazard** Health Hazard (blue): ranks the specific material's probable severity to personal health, and recommended protection	
Reactivity Reactivity (yellow): ranks the specific material's ease, rate, and quantity of energy released		**Specific Hazard** Specific Hazard (white): identifies the specific material's special hazard potential or any special protection which may be required	
Flammability		**Health**	
4	Very Flammable; Below 73°F, Boiling point below 100°F	4	Deadly; Special full protective suit and breathing apparatus must be worn
3	Ignites under normal temperature conditions; Above 73°F (Boiling point at/above 100°F) and At or above 73°F (Boiling point not exceeding 100°F)	3	Extreme Danger; Full protective suit and breathing apparatus should be worn
2	Ignites with moderate heating	2	Hazardous; Breathing apparatus with full face mask should be worn
1	Ignites when preheated	1	Slightly Hazardous; Breathing apparatus may be worn
0	Will not ignite	0	Normal Material; No precautions necessary
Reactivity		**Special**	
4	May detonate under normal conditions	OX	Oxidizer
3	May detonate with shock or heat	ACID	Acid
2	Violent chemical change but does not detonate	ALK	Alkali
1	Not stable if heated - use precautions	COR	Corrosive
0	Normally stable	W	Use No Water
			Radioactive

24.9.5 Appendix E: Sample Label

Sample preprinted hazardous material label (available from the Safety Office)

END OF DOCUMENT